

CLAIMS

WHAT IS CLAIMED IS:

5 1. A polyether ester comprising poly(trimethylene-ethylene ether) ester soft segment and alkylene ester hard segment.

10 2. The claim 1, wherein the polyether ester is a thermoplastic elastomer in which the hard segment comprises C₂ to C₁₂ alkylene ester.

15 3. The elastomer of claim 2, wherein the hard segment comprises tetramethylene ester.

20 4. The elastomer of claim 2, wherein the hard segment comprises trimethylene ester.

25 5. The elastomer of claim 2, wherein the hard segment comprises dimethylene ester.

20 6. The polyether ester of claim 1, comprising about 90 to about 10 weight % poly(trimethylene-ethylene ether) ester soft segment and about 10 to about 90 weight % alkylene ester hard segment.

25 7. The elastomer of claim 2, comprising about 90 to about 60 weight % poly(trimethylene-ethylene ether) ester soft segment and about 10 to about 40 weight % alkylene ester hard segment.

30 8. The elastomer of claim 7, comprising about 70 to about 85 weight % poly(trimethylene-ethylene ether) ester soft segment and about 15 to about 30 weight % alkylene ester hard segment.

9. The elastomer of claim 1, wherein the mole ratio of hard segment to soft segment is at least about 2.0.

10. The elastomer of claim 9, wherein the mole ratio of hard
5 segment to soft segment is about 2.0 to about 4.5.

11. The elastomer of claim 10, wherein the mole ratio of hard segment to soft segment is about 2.5 to about 4.0.

10 12. The elastomer of claim 1, prepared by providing and reacting:

- (a) poly(trimethylene-ethylene ether) glycol,
- (b) diol, and
- (c) at least one of dicarboxylic acid, ester, acid chloride
15 and acid anhydride.

13. The elastomer of claim 12, wherein the diol is at least one of 1,4-butanediol, 1,3-propanediol or 1,2-ethanediol.

20 14. The elastomer of claim 12, wherein the dicarboxylic acid, ester, acid chloride and acid anhydride is at least one aromatic dicarboxylic acid or ester.

25 15. The elastomer of claim 14, wherein the aromatic dicarboxylic acid or ester is selected from the group consisting of dimethyl terephthalate, bibenzoate, isophthalate, phthalate and naphthalate, terephthalic, bibenzoic, isophthalic, phthalic and naphthalic acid and mixtures thereof.

30 16. The elastomer of claim 15, wherein the aromatic dicarboxylic acid or ester is at least one of terephthalic acid and dimethyl terephthalate.

17. The elastomer of claim 1, prepared by providing and reacting:

- (a) poly(trimethylene-ethylene ether) glycol
- 5 (b) at least one polyester.

18. The elastomer of claim 17, wherein the polyester is at least one of polyethylene terephthalate, polytrimethylene terephthalate and polytetramethylene terephthalate.

10

19. Fiber prepared from polyether ester elastomer comprising a soft segment from poly(trimethylene-ethylene ether) glycol and alkylene ester hard segment.

15

20. The fiber of claim 19, which is monocomponent filament, staple fiber, or multicomponent.

21. The fiber of claim 19, wherein the hard segment comprises C₂ to C₁₂ alkylene ester.

20

22. The fiber of claim 19, wherein the hard segment comprises tetramethylene ester.

25

23. The fiber of claim 19, wherein the hard segment comprises trimethylene ester.

24. Fabric made from the fiber of claim 19.

25. Films or membranes prepared from polyether ester
30 elastomer comprising a soft segment from poly(trimethylene-ethylene ether) glycol and alkylene ester hard segment.